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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/448,578	11/23/1999	NICK J. HUIGE	661005.90012	5200

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QUARLES & BRADY LLP  
411 E. WISCONSIN AVENUE  
SUITE 2040  
MILWAUKEE, WI 53202-4497

EXAMINER

CHAWLA, JYOTI

ART UNIT PAPER NUMBER

1761

DATE MAILED: 02/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/448,578	<b>Applicant(s)</b> HUIGE ET AL.	
	<b>Examiner</b> Jyoti Chawla	<b>Art Unit</b> 1761	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 July 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4-6 and 10-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-6 and 10-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 November 1999 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. The response filed July 11, 2005 has been entered. Claims 1, 2, 4-6, 10 and 11 remain pending. Claim 1 has been amended and claim 12 has been added to the application.

#### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-2, 4-6, 10 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. The language of the newly amended claim 1(e) uses relative term, which renders the claim indefinite. The term "increasing an oxygen delivery pressure on the gas side of the membrane and increasing a liquid pressure on the liquid side of the membrane in dependence on the oxygen uptake rate " is not defined by the claim, neither the claim language nor the specification provides a measure of the requisite degree to which the pressure on the liquid side needs to be increased in relation to the pressure increase for the oxygen delivery and further the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1,2,4-6 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Quain et al. (GB pat. No. 2197341) ("Quain") and in view of Masschelein et al (Malting and Brewing Process) (" Masschelein"), and further in view of Dean Jr. et al. (US Pat No. 4978616) ("Dean"), ~~and~~ Ripka (US Pat No. 4764471), <sup>and Vogel et al.</sup>

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8. See the reasons stated in the office action mailed January 12, 2005.

9. In regard to claim 1, applicants have amended their pending claim 1 to include steps (d) of determination of oxygen uptake rate and step (e) to include "increasing an oxygen delivery pressure on the gas side of the membrane and increasing a liquid pressure on the liquid side of the membrane in dependence on the oxygen uptake rate".

10. In regards to claim 1(d), Quain teaches the step of monitoring the oxygen content of the yeast suspension and also the step of progressively increasing the rate of oxygen

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introduction into the yeast suspension in such a manner that the concentration of oxygen in the suspension remains substantially constant (page 1, lines 43-55).

11. In regards to Claim 1(e), Quain is silent as to the pressure increase in the delivery of oxygen and the slurry however Quain does teach the slurry containing yeast passes through a relatively large cylinder and the gas containing oxygen passes through a relatively small cell (fig4) and he also teaches the increase in flow rate of oxygen in a manner as to maintain its concentration in the slurry suspension relatively constant.

12. In regards to claim 1(e) Dean teaches fermentation or oxygenation using a gas membrane exchanger, and according to Dean, in order to enhance the rate of mass transfer of gas to the liquid, generally oxygen is used at an elevated pressure, about 10 atmosphere absolute pressure or higher, and the liquid is passed through tubes of the gas membrane exchanger at a high Reynolds' number (Re). (Re) is an indicator of the flow of liquid through a pipe (Process Associates). The higher the (Re) the more turbulent the flow and for a viscous liquid like yeast slurry in order to have a high (Re), it either needs to pass through a very long tube or have a high rate of flow. Since increasing the flow rate is more feasible and economical option, it is reasonable to assume that it would be the preferred way of increasing (Re). One of the ways to increase the flow rate is to increase the pressure with which the liquid is being pumped into the gas membrane exchanger so it would have been obvious for the one skilled in the art at the time of the invention to alter the pump pressure to increase the flow of

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liquid in order to increase the Reynolds Number of the liquid as taught by Dean. And similarly it would have been obvious to modify Quain based on the teachings about the higher (Re) of the liquid in order to make certain that the oxygen uptake rate by the yeast is relatively the same as the oxygen diffusion rate across the membrane, which would mean that relative pressures of the gas as well as the liquid phase have to be adjusted such that too much or too little gas does not diffuse into the liquid.

13. In regards to claim 12, which recites the oxygen uptake rate of the slurry is determined from a first dissolved oxygen concentration reading taken in the yeast tank and a second dissolved oxygen concentration reading taken downstream of the membrane contactor. As described above Quain teaches the step and addresses the apparatus for monitoring the oxygen content of the slurry and measurement of oxygen uptake rate by taking measurements of the oxygen level of yeast slurry (Page 1, lines 42-65). Therefore to measure the oxygen uptake rate of the yeast slurry by monitoring it as taught by Quain would have been known to the one skilled in the art at the time of the invention and applicant's intended function would have been obvious.

14. In regards to applicant's argument that Quain does not use a hydrophobic, microporous membrane to transfer oxygen. In response to applicant's remarks even though Quain does not use the hydrophobic, microporous membrane, Masschelein uses a microporous sparger, Dean teaches fluidized bed cell cultivation and fermentation process and Ripka teaches continuous treatment and propagation of yeast

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and other cell cultures using filtration or purification systems as discussed in the previous office actions. Vogel et al teach that microporous membranes as being employed for clarification of fermentation broths and also for concentration of yeast suspensions by the ones skilled in the art at the time of the invention.

### ***Response to Arguments***

15. With respect to the rejections made under 103(a), Applicants contend that the prior art Quain and Masschelein do not use a hydrophobic, micro porous membrane to transfer oxygen, Dean does not increase the pressure on the liquid side and about not addressing the foaming problem. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

16. In regards to applicant's argument that Quain does not use a hydrophobic, microporous membrane to transfer oxygen. In response to applicant's remarks, as discussed above even though Quain does not use the hydrophobic, microporous membrane, however Vogel et al teach that microporous membranes as being employed for clarification of fermentation broths and also for concentration of yeast suspensions. Applicant is reminded that all the above stated references are being relied upon to establish obviousness and not anticipation, therefore the applicant cannot show

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nonobviousness by attacking references individually where the rejections are based on combinations of references.

17. Applicants argue that Dean does not teach increasing the liquid pressure on the liquid side of the membrane. As discussed above Dean teaches increase in pressure of oxygen in order to enhance the rate of mass transfer of gas to the liquid, and he also teaches high Reynolds' number of the liquid. As discussed above for a viscous liquid like yeast slurry in order to have a high (Re), it either needs to pass through a very long tube or have a high rate of flow. One of the ways to increase the flow rate is to increase the pressure with which the liquid is being pumped into the gas membrane exchanger. Therefore Dean does discuss the liquid pressure by discussing the Reynold's Number of liquid.

18. Applicants further argue that Ripka does not recognize the foaming problem or that shows or suggests the control of the pressure ratio on the liquid and the gas side of the membrane. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., foaming problem) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).



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19. However to address the issue, Masschelein, and not Ripka recognize the foaming problem and he teaches the use of microporous sparger and regulating oxygen levels, time, temperature and recirculation rates in order to reduce foaming (page 382) over the oxygenation.

20. In regards to the remarks about the newly added claim 12, where the applicant states "the measurement of dissolved oxygen in the yeast tank and downstream of the membrane contactor" has not been addressed by the prior art applied in the rejection. The applicant is respectfully reminded that Quain teaches monitoring the oxygen content of the yeast slurry, and that would not be possible without measuring the oxygen content at various levels. Please also note the rejection on record.

***Conclusion***

21. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jyoti Chawla whose telephone number is (571) 272-8212. The examiner can normally be reached on 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton Cano can be reached on (571) 272-1398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jyoti Chawla  
Examiner  
Art Unit 1761

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MILTON I. CANO  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700